

REMARKS

Applicants resubmit herewith the PTO-1449 form filed with the IDS on August 3, 2002, and request that the Examiner initial reference AR and return a copy of the PTO-1449 form to the undersigned to indicate that the document has been considered. The publication date of the article has been added to the PTO-1449 Form.

Applicants have cancelled claim 2 without prejudice or disclaimer, and added new claims 11-16. Accordingly, claims 1, 3-6, 8, and 11-16 are pending. Reconsideration of the rejections set forth in the Office Action are requested for the following reasons.

With respect to the drawing requirement in which Fig. 2 has been identified by the Examiner as being prior art based on the description of the figure in the specification, Applicants have amended the specification to clearly set forth that Fig. 2 is directed to the problem studied by the Applicants. Accordingly, Fig. 2 is not prior art and there should be no requirement to label the figure with the legend "Prior Art".

Applicants request reconsideration of the rejection of claim 1 as being unpatentable over the admitted prior art

(APA) in view of Young et al (Young) and Zhao. Further, reconsideration of the rejection of claims 3-6 and 8 as being unpatentable under 35 U.S.C. 103 over APA in view of Young and Zhao, and further in view of Loewenstein is respectfully requested.

Claim 1 has been amended to include the limitations of claim 2 and to set forth that the second insulating layer includes at least a porous low-k film. Further, claim 1 has been amended to include that the third step for patterning the second insulating material layer includes at least a step for forming a via hole. As amended, claim 1 overcomes the rejection under 35 U.S.C. 103.

As pointed out by the Examiner, Young teaches using a full dry cleaning process instead of a wet clean process. However, Young does not disclose the combination of claim 1 which includes that the sample is not exposed to the atmosphere during all of the periods from the start of the third step to the end of the fourth step. Further, Young does not disclose transforming as in the present invention, for example.

Zhao is relied upon for disclosing that it is conventional to clean a sample with pure water after CMP. However, the combination of Young et al and Zhao do not

disclose or suggest the fully dry-type processing including a step for patterning an insulating material layer including at least a porous low-k film that includes a step for forming a via hole, as claimed by Applicants. Accordingly, claim 1, as amended, overcomes the 35 U.S.C. 103(a) rejection.

In claims 3-6 and 8, the Examiner further applies the Loewenstein reference for disclosing the use of NF_3 and Ar to etch an insulating layer in order to have high etching selectivity. However, Loewenstein does not overcome the deficiency noted in the combination of the Young and Zhao references with respect to the combination set forth in amended claim 1, for the foregoing reasons. Therefore, the rejection of claims 3-6, which depend from claim 1 as a base claim, should be withdrawn.

With respect to claim 8, the claim has been rejected for merely setting forth process parameters that can be determined by routine experimentation in the art of plasma etching/cleaning. However, Applicants point out that the negative DC voltage applied to the sample in which the off period of the on/off application is below 10^{-6} seconds to etch the insulating film deposited on a copper layer provided on a sample under the conditions of the negative DC voltage being below 200V is not obvious or obtainable through routine

experimentation. By applying the negative voltage in the manner as claimed, the ions cannot reach the inner wall of the processing chamber 21 during the off period since this period is sufficiently short. Accordingly, the inner wall material of the processing chamber 21 is prevented from being subjected to the ion bombardment. The advantages of this aspect of the claimed combination is set forth in the specification on page 19, line 24 to page 20, line 2. Accordingly, claim 8 should be found to be patentable under 35 U.S.C. 103(a).

New claim 11 depends from claim 3 and recites that the mixed gas contains NF_3 and Ar.

Applicants have added new claim 12, which is similar to claim 3, without reciting that the third step for patterning the second insulating material layer includes at least a step for forming a via hole.

New claim 13 depends from claim 12 and corresponds in content to claim 11.

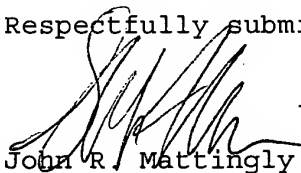
New claims 14 and 15 depend from claim 12 and respectively correspond to claims 4 and 5. New claim 16 corresponds to claim 6, as amended, however claim 16 depends from claim 11, which sets forth that the mix gas contains NF_3 and Ar.

Applicants request entry of new claims 11-16 since the

claims present issues that have already been considered by the Examiner, and therefore no new issues requiring further search and/or consideration are raised by the presentation of the new claims.

In view of the foregoing amendments and remarks,
reconsideration and reexamination are respectfully requested.

Respectfully submitted,

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